



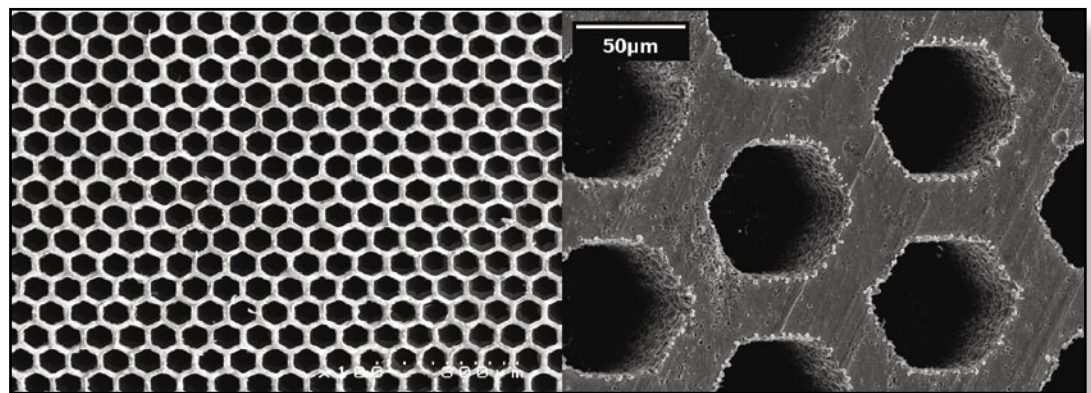
# Air Force Research Laboratory|AFRL

*Science and Technology for Tomorrow's Air and Space Force*



## **Success Story**

### **AFRL SBIR PROGRAM BENEFITS MICROFABRICATION COMPANY**



Initial Results, Micromolded Lead (Left) and Erbium (Right) for Advanced Cryocooler Regenerators

AFRL's Space Cryogenic Cooling Technology Group has worked with International Mezzo Technologies since 2002 on AFRL Small Business Innovation Research (SBIR) projects to develop and fabricate advanced regenerators. The group used innovative techniques to improve the performance of low-temperature cryocoolers for AFRL and the Missile Defense Agency. These research efforts led to developments in microfabrication techniques that benefited Mezzo's other heat exchanger products. The techniques for making advanced recuperators and micro heat exchangers benefited from these regenerator programs and now have their own SBIR programs.



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### **Accomplishment**

International Mezzo Technologies is developing microfabrication technologies to build cryocooler regenerators. Regenerators are key to cryocooler performance at 40°K and below and are thus critically important in the development of high-efficiency, low-temperature cryocooler systems. Their advanced geometries, which engineers can form using micromolding techniques, have the potential to improve low-temperature cryocooler efficiency two to three times over that of traditional regenerators such as powders and screens. Under SBIR programs, researchers developed processes to form microstructures in both lead and rare-earth materials, such as Erbium.

### **Background**

Mezzo Technologies is also part of the research team for a National Aeronautics and Space Administration program to develop and use these manufacturing technologies for fabricating Stirling engine regenerators. In addition to its SBIR programs, Mezzo generated commercial contracts in its micro heat exchanger program and is poised to commercialize its first product. Mezzo's exceptional work earned the Outstanding Small Business Award from the Louisiana Business Incubation Association, the Rising Star Award from the Baton Rouge Business Report and Baton Rouge Technology Council, and the Outstanding SBIR Company Award from the Louisiana Business and Technology Center. In addition, the state of Louisiana awarded Mezzo a \$500,000 program to build a new state-of-the-art facility.

Space Vehicles  
Technology Transfer

### **Additional Information**

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (05-VS-01)